

FROG FAUNA OF THE NORTHERN TERRITORY: NEW DISTRIBUTIONAL RECORDS AND THE DESCRIPTION OF A NEW SPECIES

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Summary

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Uperoleia trachyderma sp. nov. is described from the Northern Territory, and additional biological and distributional data are given on *U. lithomoda* Tyler, Davies & Martin. *Ranidella deserticola* Liem & Ingram is recorded in the Northern Territory for the first time, and *Cyclorana cryptotis* Tyler & Martin is recorded for the second time.

Introduction

Our collaborative studies on the frogs of northern Australia have led to the addition of seven species to the North Territory fauna (Martin, *et al.* 1980; Tyler, *et al.* 1978, 1981a; Tyler, *et al.* 1979). Our previous field studies in the Northern Territory have been confined to the East Alligator River area.

However in December 1980 we collected at various sites on the Stuart Highway between Darwin and Tennant Creek. These collections include a new species of the leptodactylid genus *Uperoleia*, and a second leptodactylid species not previously recorded from the Northern Territory. We also provide additional information on the distribution and biology of *U. lithomoda* Tyler, Davies & Martin, previously recorded in the N.T. only from the flood plains west of Arnhem Land (Tyler *et al.* 1981a), and the hyliid *Cyclorana cryptotis* Tyler & Martin.

Material and Methods

The specimens reported here are located in the following collections: American Museum of Natural History (AMNH); Northern Territory Museum, Darwin (NTM); Museum of Natural History, University of Kansas, Lawrence (KU); South Australian Museum (SAM).

Methods of measurement follow Tyler (1968). Abbreviations used in the text are: E (eye diameter), E-N (eye to naris distance), IN (internarial span), S-V (snout to vent length), TL (tibia length).

Osteological data were obtained from cleared and Alizarin Red stained preparations using the technique of Davis & Gore (1947). Osteological descriptions follow Trueb (1979).

Male mating calls were recorded with a Sony TC-510-2 tape recorder and a Beyer M 88 dynamic microphone, at a tape speed of 19 cm/sec. Wet-bulb air temperatures were measured close to the calling sites of males using a Schultheis quick-reading thermometer. Calls were analysed by means of a UV oscillograph (San-Ei Visilight) and a sound spectrograph (Kay Model 6061-B Sona-Graph) with the overall response curve maintained in the FL-1 position. Three calls of each male were analysed and mean values calculated.

FAMILY: Leptodactylidae

Uperoleia trachyderma sp. nov.

FIGS 1-4

Holotype SAM R20374, an adult male collected on the Newcastle Creek floodplain at the George Redman Causeway (17°14'S; 133°28'E) 37 km N of Elliot, N.T. on 16.xii.80 by M. Davies, A. A. Martin and M. J. Tyler.

Definition: A small species (males 20.3-22.0 mm S-V) with small eyes (eye diameter equivalent to eye to naris distance), with the dorsum covered with small, conical tubercles, and with a heavily pigmented ventral surface. Mating call a staccato burst of four short pulses.

Description of holotype: Maxillary and vomerine teeth absent. Snout elongate, pointed when viewed from above; projecting slightly in profile. Eye to naris distance greater than internarial span (E-N/IN 1.27). Canthus rostralis straight. Tympanum not visible externally (Fig. 1).

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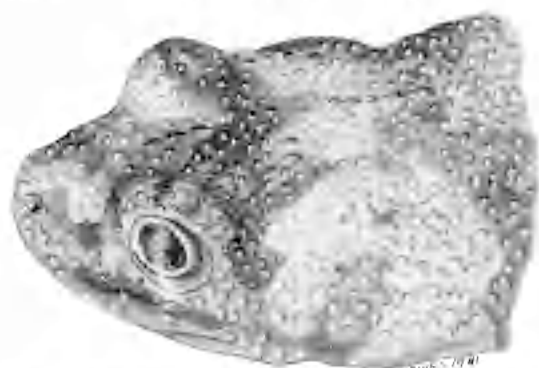


Fig. 1. Dorsolateral view of head of *Uperoleia trachyderma*.

Fingers long, slender, unwebbed and unfringed with prominent subarticular tubercles and well developed palmar tubercles (Fig. 2A). Fingers in order of length $3 > 4 > 2 > 1$. Hindlimbs very short (TL/S-V 0.35). Toes long, slender, slightly fringed and unwebbed (Fig. 2B). Toes in order of length $4 > 3 > 5 > 2 > 1$. Metatarsal tubercles small and poorly developed. Subarticular tubercles small but prominent.

Dorsal surface densely covered with small, conical tubercles. Parotoid and inguinal glands inconspicuous; coccygeal glands not visible externally. Ventral surface finely granular. Cloacal flap narrow but well developed. No heel tubercles.

Dorsal surface dull slate with obscure, slightly darker mottling; glands faintly creamish. Inguinal and post-femoral flash markings dull red. On ventral surface sub-mandibular area pale grey; abdomen with numerous small islands of pale grey on a white background.

Dimensions: Snout to vent length 20.75 mm; tibia length 7.3 mm; eye to naris distance 1.9 mm; internarial span 1.5 mm; eye diameter 1.9 mm.

Variation: There are four paratypes; all are adult males: KU 189561, NTM 9865, SAM R20375-6. The series was collected with the holotype.

The range of body size spans only 1.7 mm (20.3-22.0 mm S-V). The hindlimbs are short (TL/S-V 0.33-0.36) and the metatarsal tubercles (so well developed in congeners) are comparatively poorly developed. The eye diameter is consistently small and approximates the eye to naris distance. The eye to naris dis-

tance is greater than the internarial span (E-N/IN 1.13-1.40).

The unusual tubercular condition of the dorsal skin is apparent in all specimens, and in some is more conspicuous than in the holotype.

The dorsal coloration is reasonably uniform except that in one specimen the parotoid, inguinal and coccygeal glands are bright yellow-cream and stippled with black. In all specimens the dark mottling on the abdomen is more conspicuous than in the holotype.

In life the dorsum is variegated with clearly defined patches of grey on a paler grey ground colour, except for the dermal glands which are suffused with pale orange. The inguinal and post-femoral flash markings are bright carmine. The sub-mandibular area is slate, and the abdomen is marked with islands of grey upon a creamish-grey background.

Osteology: Skull (Fig. 3A) moderately ossified, sloping anteroventrally. Sphenethmoid poorly ossified, not conjoined medially either dorsally or ventrally. Dorsally sphenethmoid in tenuous contact with nasals. Ossified portion of sphenethmoid extending ventrally for about $\frac{1}{3}$ length of orbit. Prootic and exoccipital not fused dorso- or ventromedially. Fenestrae present dorsally and ventrally in crista parotica. Crista parotica short, thick, slightly overlapped medially by posterior extremities of frontoparietals, widely separated laterally from unexpanded otic rami of squamosals.

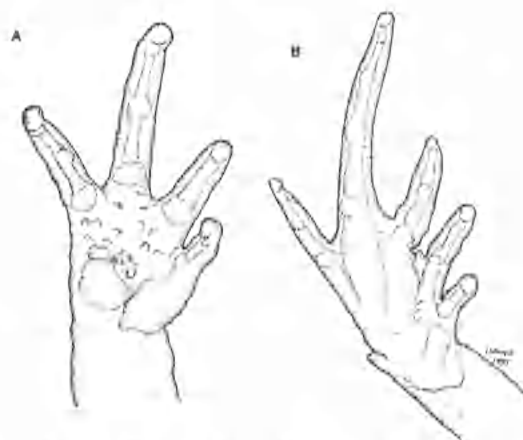


Fig. 2. (A) Palmar view of hand and (B) plantar view of foot of *Uperoleia trachyderma*.

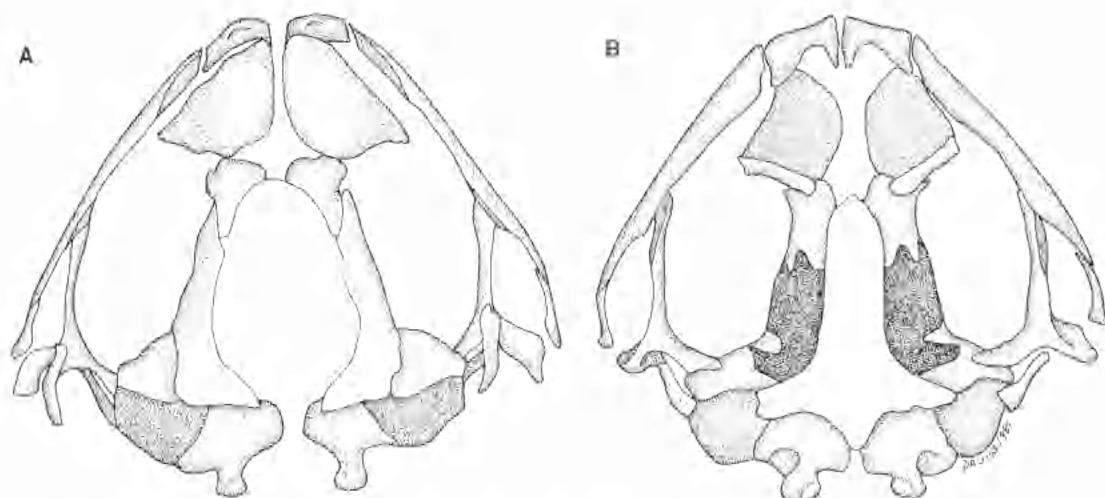


Fig. 3. (A) Dorsal and (B) ventral view of skull of *Uperoleia trachyderma*.

Frontoparietal fontanelle extensively exposed; anterior and posterior extremities being undefined because of lack of medial ossification of sphenethmoid and exoccipital regions. Nasals extremely well ossified, lying alongside each other medially. Maxillary processes of nasals short and acuminate, not in bony contact with very poorly developed preorbital process of shallow pars facialis of maxillary.

Palatines reduced (Fig. 3B), moderately broad, overlying ossified portion of sphenethmoid medially at angle of approx. 45°.

Parasphenoid robust; long, broad cultriform process, almost truncate, reaching to level of posterior edge of palatines. Alae broad, short, slightly angled posteriorly from cultriform process. Pterygoids moderately robust; anterior arm slender, in moderately short contact with poorly developed pterygoid process of palatal shelf of maxillary. Medial arm moderately long, very robust; posterior arm short and moderately sharp.

Cartilaginous quadrate present between base of squamosal and quadratojugal. Quadratojugal robust, in firm contact with maxillary. Squamosals stocky, no zygomatic ramus, long unexpanded otic ramus. Maxillary and premaxillary edentate. Alary processes of premaxillaries moderately broad, perpendicular to premaxillary. Palatine processes of premaxillaries well developed, not abutting medially. Palatal shelf moderately deep with poorly developed pterygoid process. Prevomers absent. Bony columella present.

Pectoral girdle arciferal, robust. Omosternum absent, xiphisternum present. Clavicles slender, curved, closely applied medially. Coracoids robust, widely separated medially. Bicapitate scapula considerably shorter than clavicles. Suprascapula about $\frac{1}{2}$ ossified.

Eight prococleous non-imbricate presacral vertebrae. Sacral diapophyses poorly to moderately expanded. Relative widths of transverse processes III > sacrum > IV > II > V = VI = VII = VIII. Iliia extending to anterior extremity of sacral diapophyses. Sacrococcygeal articulation bicondylar. Urostyle with well developed crest extending about $\frac{1}{4}$ of its length.

Humerus with strongly developed antero-proximal crest. Phalangeal formula of hand 2-2-3-3. No bony prepollex. Palmar sesamoids present. Phalangeal formula of foot 2-2-3-4-3. Well developed bony prehallux. Terminal phalanges knobbed.

Comparison with other species: *Uperoleia trachyderma* is a distinctive species, particularly in the dorsal skin texture of dense, small but prominent tubercles. Other species with extensive frontoparietal fontanelles comparable to the condition in *U. trachyderma* (*U. russelli*, *U. arenicola*, *U. borealis*, *U. talpa*, and *U. orientalis*) have moderate to extensive webbing between the toes (except in *U. arenicola*). *Uperoleia arenicola* resembles *U. trachyderma* in lacking webbing, but the dorsal skin is smooth or weakly tubercular (tubercular in *U. trachyderma*). The call of *U. orientalis*

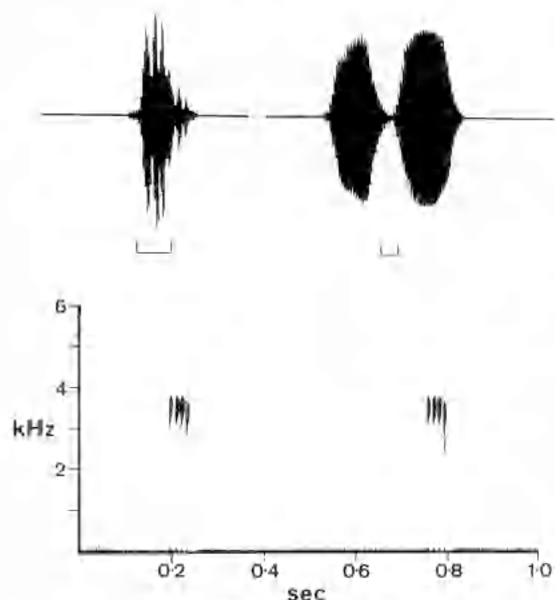


Fig. 4. Upper: oscillographic tracings of male mating calls of: left, *Uperoleia lithomoda*, 6.4 km N of Katherine, N.T.; right, *Ranidella deserticola*, 40 km N of Elliot, N.T. The time marker in each case is 10 msec. Lower: audio-spectrogram (300 Hz bandpass) of two consecutive calls of *Uperoleia trachyderma*, 37 km N of Elliott, N.T.

(which has moderate toe webbing) is not known, but it is probably a larger species (males 26-28 mm, compared with 20-22 mm in the small sample of *U. trachyderma*). No other northwestern Australian congener is known to have a four-pulsed mating call.

The similar-sized *U. lithomoda* taken north of the site of *U. trachyderma* has poorly developed dorsal tubercles, a shorter call, a very poorly exposed frontoparietal foramen, and larger eyes.

Mating call: Calls of two males were recorded 37 km N of Elliot, N.T., on 16.xii.80. An audiospectrogram of a call is shown in Fig. 4, and physical characteristics of calls are listed in Table 1. The call is a harsh "creak", consisting of four short pulses produced in about 50 msec. The pulse repetition rate is about 79 pulses/sec and the dominant frequency about 3600 Hz.

Distribution: Known only from the type locality.

Habitat: The type locality is a flat floodplain of adhesive yellow clay. Males were calling from the base of grass tussocks growing in the water. The surroundings were flooded to a depth of 0.3 m.

Etymology: From the Greek *trachys*, 'rough', and *derma* 'skin', in reference to the unusual skin condition.

Ranidella deserticola Liem & Ingram, 1977

This species was known previously from localities in southwestern Queensland (Liem & Ingram 1977, Tyler 1978) and northeastern South Australia (Brooks 1980).

We found *R. deserticola* upon the Newcastle Creek floodplain 40 km north of Elliot (170°14'S; 133°28'E) on 16.xii.80. Five males and one female were collected beneath debris at the edge of a deep dam (SAM R19118-23). Calls of two males were recorded at a wet bulb air temperature of 25.4°C.

An oscillographic tracing of a call is shown in Fig. 4. Call structure is similar to that described by Liem & Ingram (1977), but two clear emphasized frequency bands are evident

TABLE 1. Physical characteristics of male mating calls of *Uperoleia trachyderma* and *U. lithomoda*. Mean values are given with ranges in parentheses.

Species and locality	N	No. of pulses	Duration (msec)	Pulse repetition rate (pulses/sec)	Dominant frequency (Hz)	Wet bulb temp. (°C)
<i>U. trachyderma</i> 37 km N of Elliot, N.T.	2	4 (4)	51.4 (48.0-54.7)	78.5 (73.0-84.0)	3600 (3500-3700)	24.2-27.0
<i>U. lithomoda</i> 6.4 km N of Katherine, N.T.	3	5.3 (5-6)	16.3 (13.0-20.0)	342 (250-462)	3250 (3150-3400)	26.5
<i>U. lithomoda</i> 11.5 km N of Lake Argyle Village, W.A.	5	4.6 (4-5)	11.6 (9.0-13.0)	401 (333-456)	3420 (3200-3600)	26.0

at about 3450 and 4050 Hz. The note duration and call duration are shorter than recorded by Liem & Ingram (1977), but their recording may have been made at a lower temperature; they gave no temperature data. Values from our recordings are: call duration, 79-80 msec; first note duration, 24-32 msec; second note duration, 33-41 msec.

Examination of other collections reveals that *R. deserticola* is abundant in the Newcastle Waters area. M. Gillam found specimens (SAM R19184) 24 km W of Newcastle Waters homestead (17°32'S, 133°22'E) on 1.xi.76 in hollows on the mud banks of a turkey nest dam. G. A. Crook and W. Zeidler collected 16 specimens at Lake Woods, 15 km WNW of Elliot on 5.x.77 (SAM R19137-52). P. Spalding and W. Hosmer collected the species at Elliot on 11.iv.60 (AMNH 67143-45), Newcastle Waters on 13.iv.60 (AMNH 67146-52) and Anthony Lagoon on 23.iv.60 (AMNH 67153).

Snout to vent lengths of our series and those found by Crook and Zeidler are: males 14.6-18.7 mm; females 14.6-17.8 mm. Liem & Ingram (1977) cite a range of 13.0-18.4 mm for their series, but do not indicate the sex of the specimens. Presumably it embraces the range of both sexes.

The only congeners recorded from Northern Territory are *R. bilingua* Martin, Tyler & Davies (1980) and *R. remota* Tyler & Parker. From the former *R. deserticola* can be distinguished by its smaller size (*bilingua* males 15.5-23.3 mm; females 17.4-20.0 mm S-V) and different mating call. We located *R. bilingua* calling within 10 km of Katherine Gorge. Most of the Northern Territory records of *remota* by Barker & Grigg (1977) and Cogger (1979) are presumably based on *bilingua*. However *remota* occurs in Queensland and it might occupy the eastern portion of Northern Territory. It is distinguished most readily by its long, highly pulsed call (Tyler & Parker 1974).

Uperoleia lithomoda Tyler, Davies & Martin, 1981

Uperoleia lithomoda was known previously from two disjunct populations; one in the eastern Kimberley region, W.A., and one on the flood plains west of Arnhem Land, N.T. (Tyler *et al.* 1981a). We have now partially

closed the intervening gap by obtaining specimens of *U. lithomoda* near Katherine, N.T.

On 14.xii.80 we collected seven adult males and one adult female (SAM R20440-7) of this species within 5 m of the Stuart Highway 6.4 km N of Katherine (1.4 km N of the northern limit of Katherine township) (14°25'S; 132°16'E), and recorded the calls of three males. Snout-vent length of the males ranges 19.9-22.4 mm, and of the female is 22.1 mm. The female is gravid, containing pigmented ovarian eggs 1.2 mm in diameter.

In most respects the morphology of these individuals is similar to that of other populations. However in life the dermal glands are light golden, appearing as continuous stripes along the sides. The flash markings in the groin and behind the thighs are scarlet.

To the ear the mating call is a single, abrupt "click"; and in fact Tyler *et al.* (1981a) described the call of the Kimberley population as consisting of a single pulse. However oscillographic analysis of the calls of Katherine males showed the call to consist of a rapid burst of pulses. Hence calls of the Kimberley populations were re-analysed, and also shown to have multiple-pulsed calls. Fig. 4 shows an oscillographic tracing of the call of a Katherine male, and Table 1 lists the physical characteristics of calls of Kimberley and Katherine males.

The call of *U. lithomoda* may be described as a short burst of 4-6 pulses in 9-20 msec, with a pulse repetition rate of 250-450 pulses/sec. The dominant frequency is about 3300 Hz.

FAMILY: **Hylidae**

Cyclorana cryptotis Tyler & Martin, 1975

This species was described from an adult male collected at Daly Waters on 13.xii.1971; we found a further single adult male upon the George Redman Causeway, 37 km N of Elliot on 16.xii.1980. Our specimen (SAM R18973) was amongst a large number of *C. cultripes* Parker active on the road surface. (We collected 41 in 15 mins; many more individuals were present, whilst *C. australis* and *C. maculosus* were present but slightly less abundant).

In the Kimberley of W.A. *C. cryptotis* breeds in February, and *C. cultripes* is encountered rarely in that period (Tyler *et al.* 1981b, 1982). Our experiences with these

species permit the interpretation that in the N.T. *C. cryptotis* and *C. cultripes* have a similar breeding sequence.

The additional record extends the known range of *C. cryptotis* in the N.T. 110 km further south. We note that *C. cryptotis* is absent from the northern floodplain of the N.T., and the species occupies a narrow latitudinal zone illustrated by Tyler *et al.* (1982).

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